

REMARKS

In the Office Action dated 3/30/2009, the Examiner rejected claims 1-6, 8, 19 and 28 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,995,989 to Gedcke et al. (hereinafter “Gedcke”) in view of U.S. Patent No. 4,008,388 to McLafferty et al. (hereinafter “McLafferty”). Claims 1-25 were further rejected under 35 U.S.C. §101 as directed to non-statutory subject matter. By this communication, Applicant has amended claims 1 and 19 and cancelled claim 28. Claims 1-25 are presently pending in the Application. Applicant respectfully requests reconsideration of the rejected claims in view of the foregoing amendments and the arguments and remarks set forth below.

Rejections Under §101

Claims 1-25 stand rejected as being drawn to non-statutory subject matter. Applicant has amended independent claims 1 and 19, from which the remainder of the pending claims depend, to recite “[a] method of performing mass spectrometric analysis” including a step of “mass analyzing ions in a mass spectrometer to generate data corresponding to a spectrum.” This language clearly ties the claimed methods to a particular machine, i.e., a mass spectrometer, and thus satisfied the machine prong of the “machine or transformation” test set forth in the holding of *In Re Bilski*.

Applicant further submits that the claims also meet the “transformation” test of *In Re Bilski*. The claims are directed to transforming data representing mass spectra, which is in turn indicative of the composition of the analyte material. The claims involve the transformation of the mass spectral data from a raw form to a compressed form, in which the data is stored in a manner that facilitates the display of mass spectra, either with or without the associated noise, as disclosed on pp. 12-13 of the application. This transformation of data is analogous to the transformation of x-ray attenuation data discussed in *In Re Abele*, which the *Bilski* court cited as a patent-eligible process.

For the foregoing reasons, Applicant submits that all of the pending claims satisfy §101, and withdrawal of this rejection is believed to be proper.

Rejections Under §103(a)

Independent claim 1 stands rejected as being unpatentable over Gedcke in view of McLafferty. Applicant traverses this rejection as applied to the amended claim.

Independent claim 1 is directed to a method for performing mass spectrometric analysis and recites, inter alia, steps of reading mass spectral data in a processor and carrying out a statistical analysis of noise within the read data to obtain at least one statistical moment or parameter related to the distribution of the noise, determining a threshold value from the statistical moment(s) or parameter(s), identifying peaks in the spectrum by comparing data points to the determined threshold, and storing information relating to the identified peaks together with the statistical moment(s) or parameter(s). As described in the present specification, the at least one statistical moment or parameter relating to noise distribution that is derived from the mass spectrometry data and subsequently stored with the peak information may include the average or expectation value EN and the variance DN (see, e.g., p. 9, ¶2). Storage of the statistical moment(s) or parameter(s) characterizing the noise distribution along with the peak information serves several significant objectives, including but not limited to aiding algorithms that perform tasks such as substance identification from mass spectra (see p. 13).

In support of the §103 rejection, the Examiner argues that McLafferty supplies the teaching, omitted from Gedcke, of storing information related to the statistical moment or parameter(s) with the peak information. Applicant respectfully submits that McLafferty in fact fails to supply this teaching.

McLafferty describes a mass spectrometer system in which samples of unknown composition are ionized and subjected to mass analysis, and compounds in the analyzed sample are identified by matching peaks in the mass spectra to prestored mass spectral information representative of known “target” compounds. The matching process involves a probabilistic analysis reflecting the occurrence probabilities or uniqueness of the mass peaks found, and the accuracy with which the relative peak intensity pattern matches that of any of the target compounds. Storage of target compound mass spectral information is conducted in calibration mode, wherein the system automatically measures and records the data for a given compound. McLafferty provides that a characteristic subset of all of the masses determined for a given target

compound may be stored (a “contracted mass spectrum”) in place of the full mass spectrum, thereby reducing memory requirements.

While McLafferty does teach that background peak intensities may be measured during the calibration process and stored in memory (see col. 7, lines 51-53; col. 21, line 61 to col. 22, line 18), this set of background peak intensity information does not constitute the claimed “statistical moment or parameter.” Step (b) of claim 1 specifies that the statistical moment or parameter is derived from a statistical analysis of noise within the mass spectral data. McLafferty only teaches storage of the background (noise) peak intensities; it does not teach statistical analysis of noise in the data to derive a statistical moment or parameter. It will be appreciated that the storage of a statistical moment or parameter characterizing the noise distribution, as claimed, offers significant advantages over the storage of the actual background peak intensities, including but not limited to reduced memory requirements (which is particularly important for data-rich Fourier Transform mass analyzers) and reduced computation complexity. Applicant further notes that none of the text of McLafferty cited by the Examiner as teaching a step of storing a statistical moment or parameter (col. 21, lines 11-22, col. 27, lines 40-56) relates in any manner to the derivation and storage of a statistical moment or parameter characterizing noise in a mass spectrum; instead, these portions of the specification relate to the storage and utilization of the “contracted” mass spectra comprising characteristic peaks of the target compounds.

In sum, neither Gedcke nor McLafferty disclose the recited steps of carrying out a statistical analysis of noise within the read data to obtain at least one statistical moment or parameter related to the distribution of the noise, determining a threshold value from the statistical moment(s) or parameter(s), identifying peaks in the spectrum by comparing data points to the determined threshold, and storing information relating to the identified peaks together with the statistical moment(s) or parameter(s). Furthermore, there is no reason why one of ordinary skill in the art would modify the teachings of Gedcke or McLafferty to include this sequence of steps. Accordingly, the rejection of claim 1 under §103(a) is improper and should be withdrawn.

Independent claim 19 is believed to be patentable over Gedcke and McLafferty for at least the reasons advanced above in connection with claim 1. In particular, claim 19 recites

limitations of deriving at least one statistical moment/parameter representing noise in the spectral data, determining and applying a threshold based on the statistical moment(s) or parameter(s) to identify peaks, and storing the statistical moment(s)/parameter(s) with the peak information. As discussed above, Gedcke and McLafferty fail to teach or suggest the storage of the noise-related statistical moment(s)/parameter(s) with the peak information.

Finally, dependent claims 2-18 and 20-25 are submitted to be patentable over Gedcke and McLafferty at least by virtue of their dependency on allowable claims.

In view of the foregoing arguments, all of the pending claims in the Application are submitted to be allowable, and passage of the Application to issue is requested. The Examiner is invited to contact the Applicant's undersigned representative if it is believed that such action will be helpful to advance prosecution. The Commissioner is hereby authorized to charge any fees determined to be due in connection with this paper to Deposit Account 50-3267.

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Thermo Fisher Scientific Inc.
ATTN: IP Department
355 River Oaks Parkway
San Jose, California 95134
Tel: (408) 965-6014
Fax: (408) 965-6010

Respectfully submitted,

By: 

Charles B. Katz
Reg. No.: 36,564